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| EXAMINER | |
|---|---|
| RIDLEY, BASIA ANNA | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1764 | |

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/782,619 | GRIEVE ET AL. | |
| | Examiner | Art Unit | |
| | Basia Ridley | 1764 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) *15-24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *051101,011504,021104*
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of Invention I, claims 1-14 in the reply filed on 4 November 2004 is acknowledged. The traversal is on the ground(s) that the inventions are not unrelated because independent claims 1 and 15 are virtually identical. This is not found persuasive because establishing that inventions have different modes of operation, different functions, or different effects establishes that said inventions are unrelated. In the instant case the different inventions have different modes of operation, since, contrary to applicant's argument, the method for reformer startup requires addition of a first and second supply of fuel into the reformer, while addition of second supply of fuel into the reformer is not required during the method for maintaining a vehicle device in standby condition. Further, said inventions have different functions and different effects, as the effect and function of Invention I is the startup of a main reformer while the effect and function of Invention II is the maintaining a vehicle device in standby condition.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 15-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Invention, there being no allowable generic or linking claim.

### *Information Disclosure Statement*

3. The European Search Report issued in Application No. EP 2,075,165 cited in the information disclosure statement filed on 11 February 2004 have been considered, but will not be printed on any patent resulting from this application.

***Double Patenting***

4. Applicant is advised that should claim 2 be found allowable, claim 11 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

5. Applicant is advised that should claim 4 be found allowable, claim 12 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Botti et al. (EP 1,047,144).

Regarding claims 1, Botti et al., in Fig. 1, discloses a method for main reformer startup comprising the steps of:

- introducing a first supply of fuel (11) and a first supply of air (59, 63) into a micro-reformer (10);

- producing a heated reformate in said micro-reformer (21);

- directing said heated reformate (21) through a main reformer (30);

- introducing a second supply of fuel (11) and a second supply of air (59, 63) to said main reformer (30) to produce a main supply reformate (50);

While the reference does not explicitly disclose increasing said first supply of fuel to produce a heated reformate, said step is inherent in the method of Botti et al.

8. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Botti et al. (USP 6,609,582).

Regarding claims 1, Botti et al., in Fig. 1, discloses a method for main reformer startup comprising the steps of:

- introducing a first supply of fuel (11) and a first supply of air (59, 63) into a micro-reformer (10);

- producing a heated reformate in said micro-reformer (21);

- directing said heated reformate (21) through a main reformer (30);

- introducing a second supply of fuel (11) and a second supply of air (59, 63) to said main reformer (30) to produce a main supply reformate (50);

While the reference does not explicitly disclose increasing said first supply of fuel to produce a heated reformate, said step is inherent in the method of Botti et al.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 4 and 6-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Botti et al. (EP 1,047,144) or Botti et al. (USP 6,609,582), as applied to claim 1 above.

Regarding claims 4 and 12-14 Botti et al. discloses all of the claim limitations as set forth above. Additionally, the references show that the micro-reformer is significantly smaller than the main reformer (see Fig. 1 in both references), but the references do not disclose specific catalyst volumes for the micro-reformer relative to the main reformer. The specific catalyst volumes in the reformers are not considered to confer patentability to the claims. As the reactor cost of construction and efficiency of operation are variables that can be modified, among others, by adjusting catalyst volumes, the catalyst volumes in the reformers would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed catalyst volumes cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the catalyst volumes in the micro-reformer relative to the main reformer in the methods of Botti et al. to obtain the desired balance between the construction cost and the operation efficiency (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223). Additionally it would have been obvious to one having ordinary skill in the art at the time of the invention to change the volume of catalyst ratio between the micro-reformer and main reformer, since such modifications would have involved a mere change in the size of a component. A change in size is generally recognized as being

within the level of ordinary skill in the art. *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955). Where the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device, and the device having the claimed dimensions would not perform differently than the prior art device, the claimed invention is not patentably distinct from the prior art, *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

Regarding claims 6-7 and 9 Botti et al. discloses all of the claim limitations as set forth above, but the references do not disclose specific equivalence ratios of first and second fuel during the disclosed process. The fuel equivalence ratios are not considered to confer patentability to the claims. As the operation temperature and product composition are variables that can be modified, among others, by adjusting fuel equivalence ratios, the fuel equivalence ratios in the reformers would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed fuel equivalence ratios cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the fuel equivalence ratios in the micro-reformer and the main reformer in the methods of Botti et al. to obtain the desired operation temperature and product composition (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

Regarding claims 8 and 10 Botti et al. discloses all of the claim limitations as set forth above, but the references do not disclose said micro-reformer having a catalyst exit temperature

of about 500°C of greater. The specific product temperatures are not considered to confer patentability to the claims, since said temperatures are function of, among others, of operating conditions and fuel used in the reformers. Therefore, the catalyst exit temperature of the micro-reformers would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed catalyst exit temperature of the micro-reformers cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the catalyst exit temperature of the micro-reformers in the methods of Botti et al. to based on desired operation temperature and fuel composition (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

11. Claims 2-3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Botti et al. (EP 1,047,144) or Botti et al. (USP 6,609,582), as applied to claim 1 above, and further in view of Silberring (USP 4,391,794).

Regarding claims 2 and 11, Botti et al. disclose all of the claim limitations as set forth above, but the references do not disclose said method further comprising electrically pre-heating said micro-reformer.

Silberring teaches a method wherein portion of heat required for heating of the feedstock and for the endothermic reaction is provided by electric heating. Said method reduces requirements for hydrocarbons and energy (C1/L46-68).

It would have been obvious to one having ordinary skill in the art at the time of the invention to electrically pre-heating said micro-reformers of Botti et al., as taught by Silberring,

for the purpose of improving operating efficiency by reducing the requirements for hydrocarbons and energy.

Regarding claim 3, Botti et al. in view of Silberring disclose all of the claim limitations as set forth above. Additionally Botti et al. disclose the method wherein

- said micro-reformer has an inlet air temperature of about 140°C or greater and catalyst exit temperature of about 300°C of greater (see [0043] and [0047] in Botti'144 and C8/L33-44 and C9/L27-36 of Botti'582).

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Botti et al. (EP 1,047,144) or Botti et al. (USP 6,609,582), as applied to claim 1 above, and further in view of Hsy et al. (USP 5,58,314).

Regarding claim 5, Botti et al. disclose all of the claim limitations as set forth above. Additionally, while the references do not explicitly disclose material of composition for said main reformer, use of reformers consisting essentially of catalyst and ceramic compositions was conventional in the art at the time of the invention, as evidenced by Hsy et al. (C6/L15-29). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a reformer consisting essentially of catalyst and ceramic compositions as a main reformers of Botti et al., since doing so would amount to nothing more than a use of a known apparatus for its intended use in a known environment to accomplish entirely expected result.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

***Conclusion***

14. In view of the foregoing, none of the claims are allowed.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

Basia Ridley
Examiner
Art Unit 1764

BR
January 10, 2005